

# AN ANNOTATED KEY TO THE *DACOPSIS* COMPLEX OF GENERA (DIPTERA: TEPHRITIDAE: ACANTHONEVRINI), WITH TWO NEW GENERA AND ONE NEW SPECIES

DAVID L. HANCOCK

8/3 McPherson Close, Edge Hill, Cairns, Qld 4870

## Abstract

The 15 recognised species of the primarily Australasian *Dacopsis* complex are referred to 7 genera: *Austronevra* Permkam & Hancock (3 spp), *Austroriox*a Permkam & Hancock (1 sp.), *Copiolepis* Enderlein (2 spp), *Dacopsis* Hering (5 spp), *Piolepis* gen. n. (2 spp), *Paradacopsis* gen. n. (1 sp.) and *Stymbara* Walker (1 sp.). The new genus *Piolepis* comprises *P. caeca* (Bezzi), comb. n. [type species] and *P. medioflava* (Hardy), comb. n. from the Philippines, both transferred from *Dacopsis*. The new genus *Paradacopsis* comprises only *P. sulaensis* sp. n. from Sulawesi and Sula I., Indonesia. The male of *Dacopsis signata* (Walker), previously misidentified as *D. mantissa* (Hering), is recorded for the first time and illustrated. Where known, larvae of at least *Austronevra* and *Dacopsis* develop beneath the bark of newly felled or fallen logs.

## Introduction

This is the fourth in a series of papers reviewing and keying Indo-Australian and East Asian fruit flies referred to the *Acanthonevra* group in tribe Acanthonevrini (*sensu* Korneyev 1999). It deals with the *Dacopsis* complex, which occurs from Sumatra and the Philippines eastwards to Australia, the Solomon Islands and New Caledonia. Previous papers dealt respectively with the *Acanthonevra*, *Sophira* and *Rioxa* complexes (Hancock 2011a, 2012, 2014).

Permkam and Hancock (1995) placed *Austronevra* Permkam & Hancock, *Austroriox*a Permkam & Hancock, *Copiolepis* Enderlein and *Dacopsis* Hering in a group of genera within the tribe Acanthonevrini. Hancock and Drew (2003) subsequently included them in the *Acanthonevra* subgroup of Korneyev (1999). Hancock (2012) termed it the *Dacopsis* complex and included *Stymbara* Walker. Four additional, monospecific genera, *Anchiacanthonevra* Hardy, *Gressittidium* Hardy, *Mimoeuphranta* Hardy and *Parachlaena* Hering, were also included in this group by Korneyev (1999) and/or Hancock and Drew (2003); however, all have a short pterostigma on the wing and unknown hosts. *Gressittidium* was transferred to tribe Phascini by Hancock (2011b); the other genera were referred to the *Dirioxa* group of genera by Hancock (2012), together with *Dirioxa* Hendel, *Griphomyia* Hardy, *Lumirioxa* Permkam & Hancock and *Micronevrina* Permkam & Hancock.

Two Philippine species currently included in *Dacopsis*, *D. caeca* (Bezzi) and *D. medioflava* (Hardy) (Hardy 1980, Norrbom *et al.* 1999), differ significantly from the other included species and are referred here to a new genus described below. An additional new genus is proposed for a new species from the Indonesian islands of Sulawesi and Sula. In total, 15 species in 7 genera are included in the *Dacopsis* complex.

Host records are available for four species: *Austronevra australina* (Hendel), *A. bimaculata* Permkam & Hancock and *Dacopsis flava* (Edwards) were reared from beneath the bark of recently fallen *Dysoxylum gaudichaudianum* (Meliaceae) trees (Hardy 1986, Dodson and Daniels 1988, Permkam and Hancock 1995), while *Dacopsis signata* (Walker) (Fig. 1) was reared from beneath the bark of [Malaysian] timber intercepted by Plant Quarantine authorities in Guangzhou, China (Hancock and Drew 1994, as *D. mantissa*, a misidentification).

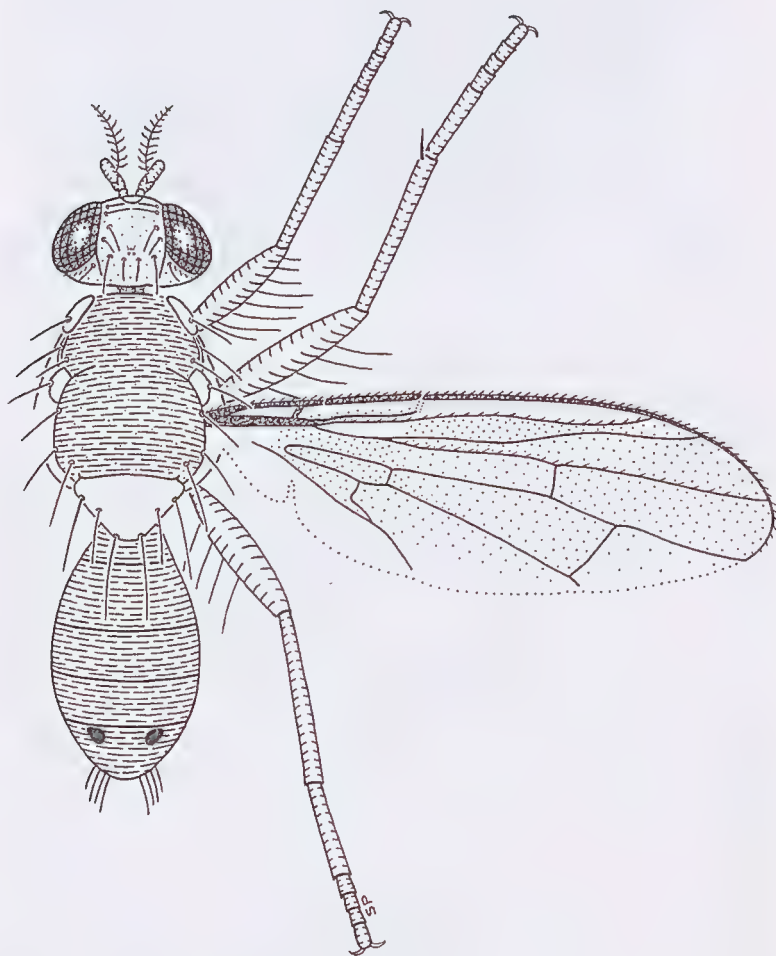


Fig. 1. *Dacopsis signata* (Walker): male habitus.

*Pioceselepis* gen. n.

Type species *Rioxa caeca* Bezzi, 1913, by present designation.

**Diagnosis.** Head higher than long, with 2 pairs each of black frontal and orbital setae; ocellars rudimentary; postocular row thin and black; antenna with third segment apically rounded and arista plumose. Thorax pale yellow on pleura and distinctly darker with a tinge of brown on scutum; setae black: 1 postpronotal, 2 notopleural, 1 presutural, 1 supra-alar, 1 postalar, 1 intra-alar, 1 pair each of dorsocentral and prescutellar acrostichal; 1 anepisternal (often with 1 weaker seta below it); anepimeral and katepisternal setae absent; 6 (3 pairs) scutellar setae, the medial pair distinct. Legs fulvous; front femur with numerous yellow hairs posteriorly; middle tibia with 1 long apical spine. Abdomen brown laterally and on tergites V and/or VI, yellow medially. Wing with vein  $R_{2+3}$  moderately curved; vein  $R_{4+5}$  setulose almost along its entire length; R-M crossvein placed at apical  $2/3$  of cell dm; pterostigma elongate, narrow and apically acute, a little longer than cell c in both sexes; cell bcu with an acute apical extension; pattern largely brown, paler brown to subhyaline at apex; cells bc and c yellow-brown to brown; cell  $r_{4+5}$  with a small hyaline spot near level of DM-Cu crossvein; cell dm with a hyaline subapical spot near level of R-M crossvein and with or without an additional posterior spot; cell m with 1 or 2 hyaline indentations; cell  $cu_1$  with 2 hyaline indentations, the basal one larger and diffuse.

Male genitalia with epandrium arched and with short, erect setae; surstyli broad; aedeagus with a prominent appendage distally. Female ovistyle elongate, about as long as tergites III-VI; aculeus apically rounded, with 2 pairs of distinct preapical setae; 3 spermathecae, smooth and rounded with short, thick necks. For illustrations see Hardy (1974).

**Etymology.** *Pioceselepis* is an anagram of *Copiolepis*, its apparent sister genus.

**Comments.** This genus differs significantly from *Dacopsis* in abdominal pattern, dark costal cells and length of the male pterostigma (greatly elongate in male *Dacopsis*). Hardy (1980) also noted that the head and thoracic setae are black (yellow to brown in *Dacopsis*) and male genitalia appear to be distinctive. An elongate ovistyle is typical of the *Dacopsis* complex.

*Pioceselepis* appears to be most closely related to *Copiolepis*, particularly in the dark wing pattern with its apex paler brown or subhyaline and the thorax being distinctly paler and yellower laterally than dorsally. It differs in having the head and thoracic setae all black (rather than mostly fulvous), 3 pairs of scutellar setae (rather than 2) and in the lack of abdominal plumes in males.

Two species are known, both from the Philippines: *P. caeca* (Bezzi, 1913), **comb. n.** (Figs 2-3) from Luzon and *P. medioflava* (Hardy, 1974), **comb. n.** (Fig. 4) from Mindanao and Samar, both transferred from *Dacopsis*.



**Figs 2-4.** *Piocolepis* species: (2) *P. caeca*, female from Mt Makiling, Luzon, lateral view; (3) *P. caeca*, wing of female; (4) *P. medioflava*, male from Mt Malindang, Mindanao, lateral view. Photos by D. Whitmore, © Natural History Museum, London.



***Paradacopsis* gen. n.**

Type species *Paradacopsis sulaensis* sp. n., by present designation.

**Diagnosis.** Head higher than long, with 2 pairs each of fulvous to red-brown frontal and orbital setae; ocellars weak; inner vertical and postocular row black, other setae fulvous to red-brown; antenna with third segment apically rounded and arista plumose. Thorax fulvous with indistinct darker markings on scutum; setae fulvous: 1 postpronotal, 2 notopleural, 1 presutural, 1 supra-alar, 1 postalar, 1 intra-alar, 1 pair each of dorsocentral and prescutellar acrostichal; 1 anepisternal (often with 1 weaker seta below it); an additional lower medial anepisternal seta present; anepimeral and katepisternal setae present; 6 (3 pairs) scutellar setae, the medial pair distinct. Legs fulvous; front femur with numerous yellow hairs posteriorly; middle tibia with 1 long apical spine. Abdomen fulvous with or without dark lateral markings. Wing with vein  $R_{2+3}$  straight; vein  $R_{4+5}$  setulose almost along its entire length; R-M crossvein placed a little beyond middle of cell dm; pterostigma not longer than cell c in both sexes; cell bcu with an acute apical extension; pattern largely brown, hyaline at apex of cell  $r_{4+5}$ ; cells bc and c yellow-brown to brown; cell  $r_{4+5}$  with a small hyaline spot near level of DM-Cu crossvein; numerous subhyaline discal spots present; cell m with 1 hyaline indentation; cell cu<sub>1</sub> with 2 hyaline indentations.

**Comments.** *Paradacopsis* closely resembles *Hexacinia* Hendel, particularly in the presence of a distinct lower medial anepisternal seta; however, the wing is narrower, the pterostigma longer, cell m has only 1 hyaline indentation, cell  $r_{2+3}$  lacks the distinct hyaline indentation below the apex of vein  $R_{2+3}$ , the frontal setae are not distinctly reclinate and the abdomen is not distinctly spotted. It resembles *Copiolepis* in having the head and thoracic setae largely fulvous except for the inner vertical and postoculars; it differs in having the pleurae not distinctly paler than the scutum, the pterostigma shorter, 6 scutellar setae and no male abdominal plumes. It differs from *Piocollepis* in the pale head and thoracic setae and from *Dacopsis* in the dark wing pattern and lack of sexual dimorphism in the length of the pterostigma.

***Paradacopsis sulaensis* sp. n.**

(Figs 5-12)

**Types.** *Holotype* ♂, INDONESIA: labelled 'Dutch East Indies, Sula Is., ?Collector.' Also labelled 'Sul' [round label] and 'congruens' [F. Walker manuscript name] (Fig. 6). *Paratype* ♀, Sulawesi Utara, Dumoga-Bone N.P., Project Wallace, at light, Mogoganipo, 25.xi.1983, B.R. Pitkin. Both in Natural History Museum, London.

**Description.** Male (Figs 5, 7). Length of body, 6.2 mm; of wing, 6 mm. Head (Fig. 8) higher than long, fulvous; setae: 2 frontals (incurved), 2 orbitals, medial verticals and postocellars all fulvous; genal pale red-brown; lateral verticals and postocular row black; ocellars weak; antenna fulvous, shorter than face, third segment apically rounded, arista plumose.



**Figs 5-9.** *Paradacopsis sulaensis* sp. n.: (5-8) holotype male: (5) dorsal view; (6) labels; (7) lateral view; (8) head. (9) paratype female: head. Photos by D. Whitmore, © Natural History Museum, London.

Thorax fulvous; scutum with indistinct, thin, pale brown medial and dorsocentral vittae, the medial broadening and greyish posteriorly; postpronotal and notopleural lobes fulvous; a brown streak along upper margin of postpronotal lobes anteriorly. Setae all dark fulvous: 1 postpronotal, 1 presutural, 2 notopleural, 1 supra-alar, dorsocentrals just anterior to line of supra-alars, 1 postalar, 1 intra-alar, 1 prescutellar acrostichal, 2 anepisternal (lower weaker) and 1 posteromedial anepisternal, 1 anepimeral, 1 katepisternal, 6 (3 pairs) scutellars, the middle pair distinct. Legs fulvous; fore femur with row of fulvous ventral setae; mid tibia with a long black apical spine.

Wing relatively narrow; 2 small costal spines above apex of vein Sc; veins  $R_1$  and  $R_{4+5}$  setulose; R-M crossvein a little beyond midline of cell dm; pattern mostly brown; cell c yellow-brown, with 2 indistinct yellower indentations; pterostigma about as long as cell c, brown with a medial subhyaline indentation; cell  $r_1$  with a subhyaline indentation across apex of vein  $R_1$ , 2 smaller indentations medially and 1 larger indentation faintly crossing vein  $R_{2+3}$  subapically; cell  $r_{4+5}$  with a narrow hyaline apical margin; cells m with a single hyaline indentation; cell  $cu_1$  with 2 marginal and 1 submarginal hyaline indentations; disc of wing with subhyaline yellowish spots in cells  $r_{2+3}$  (1 medially),  $r_{4+5}$  (3, elongate and more or less crossing cell), br (in outer third), dm (2 elongate and transverse in outer third and 1 small basally),  $cu_1$  (1 medially in upper half); lower half of cell  $cu_1$  greyish-hyaline; cell bcu brown, with a distinct and apically acute extension; alula greyish-hyaline.

Abdomen fulvous with darker (greyish) anterior bands transversely on tergites III and IV and laterally on tergite V [possibly faded].

Female (Figs 9-12). Similar to male except as follows: wing pattern more uniformly brown in cell  $cu_1$ , cell  $r_{4+5}$  with a broader, oval apical margin that does not reach vein M and cell c with more distinct brown bands. Face with a black streak at posterolateral margin; frontal, genal and 3 anteriorly directed setae along epistome darker red-brown. Abdomen (Fig. 12) with tergites I-VI yellow medially and blackish brown laterally, partially interrupted with yellow areas on each segment to form incompletely separated spots; oviscapae blackish brown, about as long as tergites IV-VI; aculeus not exposed.

*Etymology.* Named after the type locality.

*Comments.* This species bears a superficial resemblance to *Hexacinia stellipennis* (Walker, 1860) but differs in characters noted above under generic comments. Although the male has both wings damaged, all the pieces are present (in a separate vial attached to the pin) and it is a Francis Walker manuscript specimen; hence, it has been selected as Holotype and the female as a paratype. The male characters also best show the differences from *Dacopsis* and other genera. It is known only from northeastern Sulawesi and nearby Sula Island.





**Figs 10-12.** *Paradacopsis sulaensis* sp. n., paratype female: (10) lateral view; (11) wing; (12) abdomen, dorsal view. Photos by D. Whitmore, © Natural History Museum, London.



**Key to genera and species**

This key is based in part on those of Hardy (1974, 1980) and Permkam and Hancock (1995), plus an examination of specimens in the Natural History Museum, London [BMNH], including all eight species of *Dacopsis*, *Piocolopsis* and *Paradacopsis*. \* = new island or country records based on material in BMNH.

- 1 Wing vein  $R_{2+3}$  distinctly undulate with an anteriorly directed spur from second loop; veins  $R_{4+5}$  and M strongly divergent apically; cell  $r_1$  with 2 hyaline indentations from costa; cell  $r_{4+5}$  with a small anteromedial spot; apex narrowly subhyaline; pterostigma not longer than cell c; 4 scutellar setae [eastern Indonesia (Waigeo, Papua) and Papua New Guinea; *Stymbara vagaria* Walker, 1865 and *Curvinervus walkeri* Hardy, 1959 (unjustified replacement name) are synonyms; *Curvinervus* Hardy, 1959 is a generic synonym; illustrated by Hardy 1988] ..... *Stymbara concisa* (Walker, 1864)
- Wing vein  $R_{2+3}$  not distinctly undulate and without a spur vein; veins  $R_{4+5}$  and M usually apically parallel or nearly so, if not then pattern not as above; pterostigma often longer than cell c; 4 or 6 scutellar setae ..... 2
- 2 Scutum fulvous with oblique brown to black lateral bands along margins of postpronotal lobes to notopleural calli and a similar band (sometimes interrupted) along posterior margin; wing pattern brown with numerous hyaline spots, bands or indentations; cell  $r_{4+5}$  apically dark ..... 3
- Scutum fulvous to dark fulvous with at most a pair of dark submedial vittae; wing pattern often largely hyaline or yellowish with at most dark costal or cubital bands, apical spot or discal patch; if pattern largely brown then either apex paler brown or subhyaline or cell  $r_{4+5}$  with a broad or narrow hyaline apex ..... 6
- 3 Wing veins  $R_{2+3}$  and  $R_{4+5}$  distinctly curved in apical portions and strongly divergent; pterostigma greatly elongate in male, about twice length of cell c; wing pattern distinctly dimorphic; cells br and dm with hyaline longitudinal bands, shorter in female with the latter subdivided with an apical band or spots, almost filling cells in male; cell  $r_{4+5}$  with hyaline basal patch and oblique subapical band in female, largely united in male; cells m and  $cu_1$  with broad hyaline indentations in female, diffuse hyaline margins in male [Australia (eQld, eNSW); illustrated by Permkam and Hancock 1995 (♂♀)] ..... *Austrorioxia acidimorpha* (Hendel, 1928)
- Wing veins  $R_{2+3}$  and  $R_{4+5}$  evenly curved in apical portions, not strongly divergent; pterostigma not greatly elongate in male, about as long as cell c; wing pattern not distinctly dimorphic; cells br and dm with isolated hyaline spots not longitudinal bands, if cell br with a broadly oval hyaline spot then cell  $r_{4+5}$  without an obliquely elongate subapical band ..... *Austronevra* Permkam & Hancock ... 4

- 4 Wing cell  $r_1$  with 1 hyaline indentation from costa, at apex of pterostigma; cells  $r_{2+3}$  and  $r_{4+5}$  each with a hyaline subapical spot above apical half of cell m; 4 scutellar setae [New Caledonia; illustrated by Norrbom and Hancock 2004] ..... *A. irwini* Norrbom & Hancock, 2004
- Wing cell  $r_1$  with 2 hyaline indentations from costa beyond apex of pterostigma; cells  $r_{2+3}$  and  $r_{4+5}$  without hyaline spots above apical half of cell m; 6 scutellar setae ..... 5
- 5 Abdominal tergite II marked with black laterally; wing cell c hyaline except at edges and cell m with 1 hyaline indentation [Australia (neQld: Cow Bay to Tully); illustrated by Permkam and Hancock 1995; this is the type species of *Austronevra*] ..... *A. australina* (Hendel, 1928)
- Abdominal tergite II entirely yellow; wing cell c with a medial brown band and cell m with 2 hyaline indentations [Australia (nQld: Cape York Peninsula); illustrated by Permkam and Hancock 1995] .....  
..... *A. bimaculata* Permkam & Hancock, 1995
- 6 Thorax with pleura distinctly paler and yellower than the darker scutum; wing largely brown with apex broadly paler brown or subhyaline ..... 7
- Thorax with pleura not distinctly paler and yellower than scutum; if wing largely brown then only apex of cell  $r_{4+5}$  hyaline ..... 10
- 7 Head and thoracic setae mostly fulvous; wing veins  $R_{4+5}$  and M apically divergent; vein  $R_{2+3}$  distinctly curved upwards apically; pterostigma about 1.5 times length of cell c; male abdomen with long, plume-like setae arising from base of tergite IV; 4 scutellar setae .....  
..... *Copiolepis* Enderlein ... 8
- Head and thoracic setae black; wing veins  $R_{4+5}$  and M apically parallel or nearly so; vein  $R_{2+3}$  not distinctly curved upwards apically; pterostigma only a little longer than cell c; male abdomen without long, plume-like setae; 6 scutellar setae ..... *Piocolapis* **gen. n.** ... 9
- 8 Wing with pterostigma yellowish along costal margin; cell dm without hyaline markings; male abdomen with 2 pairs of long, plume-like setae [eastern Indonesia (Papua) and Papua New Guinea (including New Britain); illustrated by Hardy 1988; this is the type species of *Copiolepis*] .....  
..... *C. quadrisquamosa* Enderlein, 1920
- Wing with pterostigma entirely brown; cell dm in male with irregular hyaline markings, absent in female; male abdomen with 3 pairs of long, plume-like setae [Australia (nQld: Iron Range); illustrated by Permkam and Hancock 1995 (♂) and Hancock 2013 (♀)] .....  
..... *C. colpopteris* Permkam & Hancock, 1995
- 9 Wing cell  $r_1$  without a large hyaline indentation at apex of pterostigma; wing apex dull brown [Philippines (Luzon); illustrated by Hardy 1974; Figs 2-3] ..... *P. caeca* (Bezzi, 1913), **comb. n.**

- Wing cell  $r_1$  with a large hyaline indentation at apex of pterostigma; wing apex subhyaline [Philippines (Mindanao, Samar); illustrated by Hardy 1974; Fig. 4] ..... *P. medioflava* (Hardy, 1974), **comb. n.**
- 10 Abdomen mostly fulvous or dark laterally, pale medially; wing cell c yellow-brown or with brown patches; pattern mostly brown with subhyaline discal spots and hyaline apex to cell  $r_{4+5}$ ; sexes weakly dimorphic; pterostigma in both sexes about as long as cell c [Indonesia (Sulawesi, Sula I.); Figs 5, 7-12] .... *Paradacopsis sulaensis* **gen. et sp. n.**
- Abdomen fulvous with 0, 2 or 4 dark spots posteriorly; wing cells bc and c hyaline to pale yellow; pattern mostly hyaline to yellowish; sexes distinctly dimorphic, females with a narrow brown costal band and often a narrow cubital band, males sometimes with a brown discal patch or apical spot; male pterostigma at least twice as long as cell c ..... *Dacopsis* Hering ... 11
- 11 Thorax with 2 longitudinal dark brown vittae on scutum; abdomen with a pair of dark spots on each of tergites IV and V; wing of female pale yellowish with a narrow dark costal band and a narrow dark band along vein  $Cu_1$ ; male unknown [Indonesia (Sumatra) and East Malaysia (Sarawak: 1♀, 4th Div., 3°49'N 113°46'E, Niah, 9-17.x.1976, P.S. Cranston\*); illustrated by Hering 1952 and Hardy 1958] ..... *D. mantissa* (Hering, 1952)
- Thorax without longitudinal dark vittae on scutum; abdomen without a pair of dark spots on tergite IV (usually present on tergite V) ..... 12
- 12 Wing crossvein R-M placed before the mid-line of cell dm, especially so in male; male with a broad, brown, inverted U-shaped discal patch, absent in female [eastern Indonesia (Papua Province: Mimika), Papua New Guinea and Australia (nQld: Cape York Peninsula); *D. picturata* Hardy, 1980 is a synonym (Hardy 1986); illustrated by Hardy 1980 (♂♀) and Permkam and Hancock 1995 (♀)] ..... *D. flava* (Edwards, 1915)
- Wing crossvein R-M placed beyond the mid-line of of cell dm, especially so in male; both sexes without a dark discal patch ..... 13
- 13 Abdomen without a pair of dark spots on tergite V, entirely fulvous; wing largely hyaline with a large dark brown apical spot in male or a narrow costal band in female [NE Papua New Guinea (New Britain, New Ireland, Huon Peninsula and Admiralty Islands: 1♀, Manus, 11.iii.1937, J.L. Froggatt\*); a record from Sarawak (Hardy 1986) is a misidentification of *D. mantissa*: specimen examined; *D. apicalis* Hardy, 1980 is a synonym (Hancock and Drew 2003); illustrated by Hardy 1980 (♂♀)] ..... *D. holoxantha* (Hering, 1941)
- Abdomen with a pair of dark spots on tergite V; wing largely yellowish or yellow fumose ..... 14



- 14 Wing largely pale yellow, hyaline posteriorly; with a narrow dark costal band (including apical part of pterostigma) in female, absent in male (Fig. 1); female abdomen without dark spots on tergite VI [Philippines (Mindanao), ?East Malaysia [locality uncertain], Indonesia (Sulawesi, Ambon); *D. dacina* Hering, 1944 and *Psila bipunctifera* Walker, 1860 are synonyms; illustrated by Hering 1944 (♀), Hardy 1974 (♀) and Hancock and Drew 1994 (♂), the latter misidentified as *D. mantissa*; this (as *D. dacina*) is the type species of *Dacopsis*] ..... *D. signata* (Walker, 1860)
- Wing largely yellow fumose, grey-brown fumose posteriorly; with a narrow dark costal band (not including pterostigma) in female; male unknown; female abdomen with a pair of black spots on tergite VI [Solomon Islands (Guadalcanal); illustrated by Hardy 1958] .....  
..... *D. quadripunctata* (Malloch, 1939)

### Discussion

The *Dacopsis* complex occurs primarily in New Guinea and northeastern Australia, with extensions to the Philippines and Sumatra in the north and west, New Caledonia in the east and New South Wales in the south. The centre of origin is difficult to determine but its major development appears to have occurred in the New Guinea region, which it presumably reached early in the evolution of the complex.

*Austronevra*, *Austrorioxa* and *Stymbara* are all endemic to New Guinea or Australia, with one species (*Austronevra irwini*) known from New Caledonia. They are characterised by the dark anterolateral and posterior bands on the scutum, the abdomen largely brown laterally and yellow medially and the wing pattern largely brown with numerous hyaline spots and/or indentations. The largely Australian distribution of this series suggests that it resulted from an early dispersal to the region.

*Dacopsis*, *Copiolepis*, *Piocolepis* and *Paradacopsis* all lack the dark anterolateral and posterior scutal bands and appear to form another related series. *Piocolepis* from the Philippines and *Copiolepis* from New Guinea and Australia share many characters (e.g. largely brown wing pattern, costal cells subhyaline to brown, apex of cell  $r_{4+5}$  often hyaline to pale brown, cell  $cu_1$  largely subhyaline, pleura distinctly paler than the scutum [cf. Figure 1 in Hancock 2013] and rounded spermathecae) that suggest a sister-genus relationship. *Piocolepis* retains well developed medial scutellar setae but lacks male abdominal plumes and is thus likely to be the more primitive of the two. The superficial similarity between *Paradacopsis* (at least in wing pattern) and *Hexacinia* (in the *Rioxa* complex), which appears to be of SE Asian origin (Hancock 2011a, 2013), suggests that Sulawesi might be the centre of origin of this series. *Paradacopsis* is placed here in the *Dacopsis* complex since the combination of a relatively narrow wing and lack of a hyaline marginal indentation below the apex of vein  $R_{2+3}$  is characteristic of



that complex; in the *Rioxa* complex the hyaline indentation is normally present except in *Sophiroides* Hendel and *Hexamela* Zia, which (like *Hexacinia*) have distinctly broader wings. Nevertheless, these two complexes are clearly closely allied and a future review is likely to combine them.

*Dacopsis* occurs widely from Sumatra, Borneo, Mindanao and Sulawesi to the Solomon Islands and northeastern Australia. It is the most widespread and speciose of the *Dacopsis* complex genera. Although both it and *Austroriox*a have sexually dimorphic wing patterns and a distinctly elongate pterostigma in males, about twice as long as cell c, the wing patterns are very different and the elongate pterostigma also occurs in *Rioxa* Walker, suggesting homoplasy. The pair of dark submedial scutal vittae seen in *Dacopsis mantissa* and both *Copiolepis* species suggests a closer relationship between these two genera than with *Austroriox*a. In *Dacopsis* the dark abdominal markings are reduced to at most isolated spots on posterior segments IV, V or VI and the wing pattern is largely hyaline to yellowish rather than brown. In *D. flava*, from New Guinea and northeastern Australia, the R-M crossvein is positioned above the basal half of cell dm rather than the apical half and this, coupled with the large discal brown patch in males, suggests it is the most derived species. On the other hand, the presence of the dark submedial scutal vittae, distinct dark band along vein Cu<sub>1</sub> (in females) and paired submedial abdominal spots on both tergites IV and V in *D. mantissa*, known from Sumatra and Borneo, suggest that it is the most primitive, leaving open the possibility that *Dacopsis* (and the complex) originated in Sundaland with a sister genus *Paradacopsis* in Sulawesi and *Piocollepis* in the Philippines, with both *Dacopsis* and *Piocollepis* (as *Copiolepis*) subsequently spreading eastwards to New Guinea and beyond as a second wave of dispersal.

### Acknowledgements

I thank Susan Phillips for preparing Figure 1 and Daniel Whitmore (BMNH) for access to specimens and Figures 2-12.

### References

- DODSON, G. and DANIELS, G. 1988. Diptera reared from *Dysoxylum gaudichaudianum* (Juss.) Miq. at Iron Range, northern Queensland. *Australian Entomological Magazine* 15(2): 77-79.
- HANCOCK, D.L. 2011a. An annotated key to the species of *Acanthonevra* Macquart and allied genera (Diptera: Tephritidae: Acanthonevrini). *Australian Entomologist* 38(3): 109-128.
- HANCOCK, D.L. 2011b. *Epinettyra setosa* Permkam & Hancock, an Australian representative of tribe Phascini (Diptera: Tephritidae: Phytalmiini). *Australian Entomologist* 38(4): 197-200.
- HANCOCK, D.L. 2012. Bamboo-stem flies: an annotated key to the species of the *Sophira* complex of genera (Diptera: Tephritidae: Acanthonevrini). *Australian Entomologist* 39(1): 5-32.
- HANCOCK, D.L. 2013. A revised checklist of Australian fruit flies (Diptera: Tephritidae: Acanthonevrini). *Australian Entomologist* 40(4): 219-236.
- HANCOCK, D.L. 2014. An annotated key to the *Rioxa* complex of genera (Diptera: Tephritidae: Acanthonevrini). *Australian Entomologist* 41(1): 45-54.

- HANCOCK, D.L. and DREW, R.A.I. 1994. New species and records of Asian Trypetinae (Diptera: Tephritidae). *Raffles Bulletin of Zoology* **42**(3): 555-591.
- HANCOCK, D.L. and DREW, R.A.I. 2003. New species and records of Phylalmyiinae (Diptera: Tephritidae) from Australia and the south Pacific. *Australian Entomologist* **30**(2): 65-78.
- HARDY, D.E. 1958. A review of the genera *Sophira* Walker and *Tritaeniopterion* De Meijere (Diptera: Tephritidae). *Proceedings of the Hawaiian Entomological Society* **16**(3): 366-378.
- HARDY, D.E. 1974. The fruit flies of the Philippines (Diptera: Tephritidae). *Pacific Insects Monograph* **32**: 1-266, pls 1-6.
- HARDY, D.E. 1980. The *Sophira* group of fruit fly genera (Diptera: Tephritidae: Acanthonevrini). *Pacific Insects* **22**: 123-161.
- HARDY, D.E. 1986. Fruit flies of the subtribe Acanthonevrina of Indonesia, New Guinea, and the Bismarck and Solomon Islands (Diptera: Tephritidae: Trypetinae: Acanthonevrini). *Pacific Insects Monograph* **42**: 1-191.
- HARDY, D.E. 1988. Fruit flies of the subtribe Gastrozonina of Indonesia, New Guinea and the Bismarck and Solomon Islands (Diptera, Tephritidae, Trypetinae, Acanthonevrini). *Zoologica Scripta* **17**: 77-121.
- HERING, E.M. 1944. Neue Gattungen und Arten von Fruchtfliegen der Erde. *Siruna Seva* **5**: 1-17.
- HERING, E.M. 1952. Fruchtfliegen (Trypetidae) von Indonesien (Dipt.). *Treubia* **21**(2): 263-290.
- KORNEYEV, V.A. 1999. Phylogenetic relationships among higher groups of Tephritidae. Pp 73-113, in: Aluja, M. and Norrbom, A.L. (eds), *Fruit flies (Tephritidae): phylogeny and evolution of behavior*. CRC Press, Boca Raton; xviii + 944 pp.
- NORRBOM, A.L. and HANCOCK, D.L. 2004. New species and new records of Tephritidae (Diptera) from New Caledonia. *Bishop Museum Bulletin in Entomology* **12**: 67-77.
- NORRBOM, A.L., CARROLL, L.E., THOMPSON, F.C., WHITE, I.M. and FREIDBERG, A. 1999. Systematic database of names. Pp 65-251, in: Thompson, F.C. (ed.), *Fruit fly expert identification system and systematic information database*. *Myia* **9**: ix + 524 pp.
- PERMKAM, S. and HANCOCK, D.L. 1995. Australian Trypetinae (Diptera: Tephritidae). *Invertebrate Taxonomy* **9**: 1047-1209.